

REMARKS

Applicants appreciate the detailed examination evidenced by the Official Action mailed November 15, 2004 (hereinafter the "Official Action"). In response, Applicants have amended independent Claims 1, 19, and 20 to further clarify that the barrier layer outside the intaglio pattern is removed "**to expose an upper surface of an oxide layer included in the mold layer,**" recitations which are not disclosed or suggested by the cited references. Accordingly, Applicants respectfully submit that the pending claims are patentable for at least the reasons discussed herein.

Amended Independent Claims 1, 19, and 20 are Patentable over Ho

Claims 1-4 and 6-18, and 20 stand rejected under 35 USC section 102 over U.S. Patent No. 6,184,138 to Ho et al. ("Ho"). *Official Action, page 2*. As discussed briefly above, Applicants have amended independent Claim 1 to recite in-part:

removing a portion of a barrier layer outside an intaglio pattern in a mold layer **to expose an upper surface of an oxide layer included in the mold layer** and avoiding removing a portion of the barrier layer on the intaglio pattern;
forming a conductive layer on the portion of the barrier layer on the intaglio pattern and on the upper surface; and
removing the conductive layer from the upper surface.

Amended independent Claims 19 and 20 include analogous recitations.

Anticipation under § 102 requires that each and every element of the claim is found in a single prior art reference. *W. L. Gore & Associates Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). Stated another way, all material elements of a claim must be found in one prior art source. *In re Marshall*, 198 U.S.P.Q. 344 (C.C.P.A 1978). "Anticipation under 35 U.S.C. § 102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention." *Apple Computer Inc. v. Articulate Systems Inc.* 57 USPQ2d 1057, 1061 (Fed. Cir. 2000). **A finding of anticipation further requires that there must be no difference between the claimed invention and the disclosure of the cited reference as viewed by one of ordinary skill in the art.** See *Scripps Clinic & Research Foundation v. Genentech Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed.

Cir. 1991). Additionally, the cited prior art reference must be enabling, thereby placing the allegedly disclosed matter in the possession of the public. In re Brown, 329 F.2d 1006, 1011, 141 U.S.P.Q. 245, 249 (C.C.P.A. 1964). Thus, the prior art reference must adequately describe the claimed invention so that a person of ordinary skill in the art could make and use the invention.

Applicants respectfully submit that Ho does not disclose, at least, removing a portion of a barrier layer outside an intaglio pattern in a mold layer "**to expose an upper surface of an oxide layer included in the mold layer.**" For example, Figures 4B-7 of Ho show that the capping layer 18 remains in place during the formation of the copper layer 26. According to Ho, the capping layer 18 provides a function of an oxidation/diffusion barrier. (*Ho*, col. 8, lines 30-31). Therefore, as understood by Applicants, Ho does not disclose the above-cited recitations of the amended claims as the capping layer 18 (*i.e.*, oxidation/diffusion barrier) of Ho remains in-place on the intermetal dielectric layer 16 during formation of the copper layer 26. In other words, contrary to the recitations of the present claims, preservation of the capping layer 18 in Ho prevents the oxide layer thereunder from being exposed.

Accordingly, Ho does not disclose the recitations of amended independent Claims 1, 19, and 20 for at least these reasons. Applicants further respectfully submit that dependent Claims 2-18 are patentable at least for the reasons discussed above in reference to amended independent Claim 1.

Amended Independent Claim 19 is Patentable over Ho and Andideh

Independent Claim 19 stands rejected under 35 USC § 103 over Ho in view of U.S. Patent No. 6,448,185 to Andideh et al. ("Andideh"). *Office Action*, page 4. As discussed above in reference to the rejections under 35 USC § 102, Ho does not disclose all of the recitations of independent Claim 19. Applicants further submit that Andideh also does not disclose the exemplary recitations discussed above shown to be missing from Ho.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations and that

there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and there must be a reasonable expectation of success of the combination. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. See MPEP § 2143. As stated by the Court of Appeals for the Federal Circuit, to support combining references in a § 103 rejection, evidence of a suggestion, teaching, or motivation to combine must be clear and particular, and this requirement is not met by merely offering broad, conclusory statements about teachings of references. *In re Dembiczak*, 50 USPQ2.d 1614, 1617 (Fed. Cir. 1999). Applicants respectfully submit that, even if Ho and Andideh were combined, the combination would not disclose or suggest all of the recitations of amended independent Claim 19 as required under 35 USC § 103.

Furthermore, there is no clear and particular evidence of a motivation or suggestion to combine Ho and Andideh as, for example, the respective references are incompatible with one another. For example, Ho states that:

Key to the invention is that, during this processing step of selective electroless depositing of a layer of copper, the cap layer 18 is in place thereby protecting the surface of the IMD from being contaminated by the copper solution during the plating process. (*Ho*, col. 7, lines 47-50).

As demonstrated by the above-cited passage of Ho, the key to the embodiments discussed therein is that the capping layer is kept in place to protect the underlying intermetal dielectric layer from being contaminated during the electroplating of copper in the hole. In contrast to Ho, Figures 1H-1I of Andideh show that the upper layers of the structure are removed to expose the dielectric 103 prior to the formation of the copper in patterns 106 and 107 by electroplating. Therefore, Ho and Andideh appear to be incompatible with one another in that Ho appears to require the capping layer 18 during the deposition of copper whereas Andideh appears to require the removal of any layers on the intermetal dielectric before deposition of copper. Therefore, as understood by Applicants, Ho and Andideh appear to be inconsistent

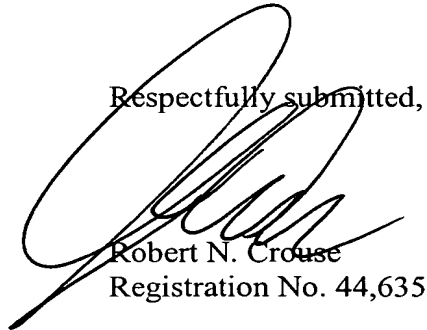
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with one another and for at least these reasons, there is no clear and particular evidence of a motivation or suggestion to combine these references as alleged. Accordingly, amended independent Claim 19 is patentable over Ho and Andideh for at least these reasons.

CONCLUSION

Applicants have amended independent Claims 1, 19, and 20 to further clarify the present subject matter. Applicants have also shown that Ho does not disclose the recitations of the amended claims and, further, that Andideh does not provide the recitations shown to be missing from Ho. Moreover, there is no clear and particular evidence of a motivation or suggestion to combine Ho and Andideh as required under 35 USC § 103. Accordingly, Applicants respectfully request the withdrawal of all rejections and the allowance of all claims in due course. If any informal matters arise, the Examiner is encouraged to contact the undersigned by telephone at (919) 854-1400.

Respectfully submitted,

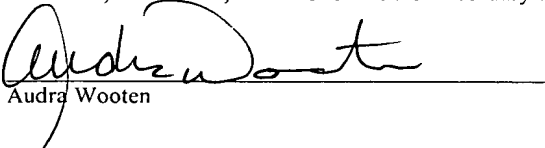


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